EPA Response: A regional interpretation of the geology and hydrogeology has been developed and documented in the San Fernando Valley Remedial Investigation (RI) of Groundwater Contamination (December 1992), available for review in Supplement 1 of the Glendale North OU Administrative Record. This regional interpretation is based on data collected as part of the basin-wide RI as well as historical data, including aquifer test data from various locations throughout the basin. Transmissivity and hydraulic conductivity values used in the modeling effort were based on this interpretation.

73. (FS Page 1-10) Without a time dimension, simply stating the volume of contaminated water as that volume which the VOCs now occupy is very misleading.

EPA Response: EPA disagrees. The initial masses of TCE and PCE were calculated from the contaminant distributions based on the results of September-October 1990 groundwater analyses, as shown in Figures 1.2-3 - 1.2-6 of the FS.

74. (FS Page 1-11) The various calculations for the masses and distribution of TCE and PCE in the area are gross estimates considering the extremely limited amount of data points. Additional data points in the area should have been included in the evaluation.

EPA Response: EPA disagrees with this comment. The Glendale North OU remedy is an interim remedy. To undertake an interim action, EPA simply needs sufficient information to justify action. In the case of the Glendale North OU area, sufficient data were available regarding risk, nature and extent of contamination and other relevant information to support EPA taking an action. In addition, it is EPA policy to initiate remedial actions early to: prevent further migration of contaminants and prevent the situation at a site from getting worse, initiate risk reduction, and/or to provide useful information to design the final remedy. Also, please see EPA Responses to Comments 70 and 71.

75. (FS Page 1-11) No chemical data are provided for the Middle Zone. It is mentioned that this zone has lower resistivity based on geophysical logs. Were any wells completed in the zone, or it is considered to be an "aquitard"? The discussion in the FS must address this matter.

EPA Response: The middle zone is not considered to be an aquitard, only a zone of lower hydraulic conductivity. No wells were exclusively completed in the middle zone. The well logs used to determine the middle zone are presented in the San Fernando Valley Remedial Investigation (RI) of Groundwater Contamination (December 1992), available for review in Supplement 1 of the Glendale North OU Administrative Record.

76. (FS Page 1-11) At least one of the figures in the chapter should indicate the location of the Headworks well field and the Grandview well field, since they are discussed.

EPA Response: These facilities are identified in Figure 2-4 of the RI Report for the Glendale Study Area (January 1992).

77. (FS Page 1-11) A brief summary of how the anticipated plume centers were selected to define the extent of contamination should be included.

EPA Response: The term "plume center" was not meant to imply point source locations or physical geometric centers, but to describe areas of anticipated higher contamination concentrations.

78. (FS Table 1.2-5) It appears that an inordinate amount of effort (and text) is devoted to estimating the mass of these compounds when the underlying assumptions (limited data and lack of NAPL residual) are extremely misleading.

EPA Response: As stated in ITT's comment, these are just estimates. Sufficient data were available to make these estimates and EPA believed it would be useful to present them.

79. (FS Page 1-12) It is unclear why the Priority Pollutant Metals are included as COCs in Table 1.2-6.

EPA Response: While the metals listed in Table 1.2-6 were only detected during the initial sampling events (1990-91), these metals were determined to pose elevated risk based on the results of the baseline risk assessment for the North Plume OU, presented in the RI Report for the Glendale Study Area.

80. (FS Page 1-15) Reference citations for the f_{oc} values used for this effort should be provided.

EPA Response: The appropriate reference is CH2M Hill (1990), Fraction of Organic Carbon in the San Fernando Basin Memorandum, Emeryville, California, October, 1990. This document is available for review in Supplement 1 of the Glendale North OU Administrative Record.

81. (FS Page 1-17) The use of a 2-dimensional model for solute transport does not adequately model the entire San Fernando Valley NPL site. In addition, due to the sparse well control for the basin, the model is extremely simplistic, should not be over interpreted, and should be used only as a planning tool. Decisions based on the model need to be evaluated very carefully, because as stated, the Glendale Study Area appears to be more complex than other areas of the SFV NPL area.

EPA Response: EPA disagrees with this comment. It is completely appropriate to conduct this type of modeling for an interim action. The purpose of this interim action was not to develop a final cleanup remedy for the Glendale North OU area or for the rest of the San Fernando Valley.

The local contaminant transport model was developed for the Glendale North Area using the 3-D, calibrated basinwide groundwater flow model (MOD-FLOW) to establish boundary conditions and to calculate groundwater flow velocities. The 2-D solute transport model in combination with the basinwide model simulated 3-D transport on a local scale. The solute transport model developed for the Glendale Study Area simulated contaminant transport in the top layer of the 3-D, basin-wide flow model. Therefore, the contaminant transport model includes the 3-D effects on solute transport. In addition, the model included input from upgradient sources such as contaminated groundwater untreated by the Burbank OU. Also see EPA Response to ITT Comment 50.

82. (FS Page 1-18) The model assumes homogeneity throughout the model. The estimates developed were based on a limited amount of available data. While all the FS's assumptions are questionable given the lack of data, the above assumption of homogeneity is inadequate, inaccurate, and misleading. The model in its current form should be used solely as a planning tool; this acknowledgment should appear in the text and currently does not.

EPA Response: The model did not assume homogeneity; the ranges of aquifer parameter values in the model are presented in Table 1.2-9 of the FS. The model developed and used to simulate contaminant transport in the Glendale Study Area was sufficient to meet the scope and objectives of the Glendale North OU interim action. Also see EPA Response to ITT Comment 81.

83. (FS Page 1-20) A brief review of the Glendale Grayson Steam Plant Operations should be provided in this section.

EPA Response: A discussion of the steam plant operations is included in Appendix A of the FS.

84. (FS Page 1-25) The conclusions implicate the Glendale Study Area Upper Zone as the source of contaminants to the Lower Zone. It appears that potential source(s) also may be upgradient of the Glendale Study Area and should be taken into consideration in the Glendale Study Area.

EPA Response: While it is recognized that upgradient sources of VOC contamination exist, the potential for the Glendale Study Area Upper Zone to also be a source of contamination to the Glendale Study Area Lower Zone is significant.

85. (FS Page 2-4) The FS states that, if reinjection is planned, the groundwater will need to be treated to current MCLs, but does not take into consideration the risk assessment. Risk assessment models will more likely assess a higher cleanup standard based on risk models of exposure.

EPA Response: As stated on Page 2-4 of the FS, "[b]ecause the remedial action established by the North Plume OU ROD will be an interim action, chemical-specific requirements to be met in the aquifer at the end of the final remedy will not be ARARS for this OU, but will be addressed as part of the basin-wide RI/FS."

86. (FS Page 2-5) Again, the FS states that MCLs must be met in order to dispose of the treated groundwater through recharge or injection. The levels are set by the RWQCB Basin Plan (1975), which establishes the Data Quality Objectives for the San Fernando Basin. These objectives are impractical in light of the basinwide contamination issues, and a more cost effective and pragmatic method of establishing clean up levels should be considered in a basinwide management program.

EPA Response: As discussed in Section 10 of the Glendale North OU Record of Decision, EPA has determined that the anti-degradation policy of the RWQCB Los Angeles Region's Basin Plan is an ARAR for recharge/reinjection at the Glendale North OU. Please review Section 10 of the ROD for a more detailed discussion.

87. (FS Page 2-6) The potential management and/or institutional actions described in the FS did not include the basinwide management of the groundwater contamination within the San Fernando Valley. Factors such as the potential presence of DNAPL, the basin configuration, and regional groundwater flow direction, among other factors warrant consideration of basinwide management. Basinwide management of the problem should be considered instead of fragmenting the basin into operable units, which may not be the most technically advantageous or cost-effective approach.

EPA Response: EPA disagrees with this comment. Again, the Glendale North OU is an interim remedy not a final remedy. EPA's policy favoring early action and the numerous other factors elaborated in previous comments above support and justify the Glendale North OU interim action. Please review EPA Responses to ITT Comments 2, 5, 30, 37, 39, 50, 51 and 74.

88. In general, the FS did not present a detailed cost analysis of the potential remedial technologies. Various scenarios, such as liquid phase advanced oxidation processes, should have been carried through to the Section 5 analysis and costed out for comparison purposes, as opposed to just presenting qualitative opinions of probable costs. In addition, numerous technologies that have been successful were eliminated, because EPA's consultant felt that further study would be required. Further study is still required

to choose the optimal systems and should not be used as a reason to rule out a specific technology, such as advanced oxidation processes (page 3-19) and the UVB system, discussed below.

EPA Response: A detailed analysis of costs is presented in Sections 5 and 6 for those technologies that were carried through alternative development. The cost estimates have an accuracy of +50 percent to -30 percent, as required by the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988). Detailed cost analysis is not required for technologies that are not carried through detailed analysis. A liquid-phase advanced oxidation process, the perozone system, was carried through alternative development (FS Section 5) and through detailed analysis (FS Section 6) as the representative innovative technology. Advanced oxidation using ultraviolet (UV) radiation was eliminated from consideration because it was determined to be significantly more costly than other aboveground treatment options. (See FS Section 4.5). Although UVB systems may be applicable for source control applications, this technology is not applicable for large-scale, area-wide remedial action. Also see EPA Responses to Comments 50 and 51.

89. (FS Table 3.1.1) Upgradient flushing is listed as a considered process option. The FS eliminated this technology based on the lack of information on sources that would make a determination on upgradient reinjection area difficult. However, despite this lack of knowledge of sources areas, EPA's contractor has identified well extraction scenarios for the GSA. For optimal locations of extraction wells for aquifer remediation and to avoid further detriment to the aquifer, knowledge of the sources in the area is necessary before siting the extraction wells.

EPA Response: EPA disagrees with this comment. Final locations of the extraction wells will be determined during the remedial design phase. Given the objectives of this interim action (remove contaminant mass from the shallow aquifer and to inhibit lateral and vertical migration of contamination), sufficient data is available to design optimal well locations, number of wells, and extraction rates for the extraction wells. Also, please review EPA Responses to previous ITT Comments including 2, 5, 37, 39, 50, 70 and 74

90. (FS Page 3-2) New technologies were not considered, such as in well air stripping technology e.g. vacuum vaporizer wells (UVB). This technology would inhibit plume migration and would not create the groundwater disposal issues associated with scenarios that involve pump and treat at the ground surface. The UVB technology has been shown to effectively treat groundwater for VOCs, with numerous successful case studies in Europe.

EPA Response: See EPA Response to ITT Comments 51, 60, and 88.

91. (FS Page 3-6) If an alternative such as in situ air stripping were chosen, the right-of-way acquisitions issues would be minimal compared to pump and treat technology with associated piping and structures. With in situ air stripping, conveyance pipeline would not be necessary.

EPA Response: See EPA Response to ITT Comments 51, 60, and 88.

92. (FS Page 3-8) An on-site carbon regeneration plant should be considered, as it may be more cost-effective. Management of the carbon system for optimal sorption capacity needs to be addressed. In addition, other sorption media such as organic polymer resins are becoming available and should be considered.

EPA Response: Although off-site regeneration of carbon was assumed for cost estimating purposes in the FS, on-site regeneration can be considered during the design phase for the selected remedial alternative. Again, please review EPA Responses to ITT Comments 51, 53, 54, 60 and 88.

93. (FS Page 3-8) Treatment of radioactive species is evaluated as a part of liquid phase GAC treatment. Radon was detected above the proposed MCL of 300 pCi/l in five well completions, which included the Upper, Lower, and Deep Zones. Radon occurs naturally throughout the San Fernando Groundwater Basin due to the erosion of granitic source rocks from which the sediments were derived. In addition, the radon levels observed in the wells, when blended with the groundwater with concentrations observed in wells below the MCLs, may not pose any risk and needs to be addressed in the FS.

EPA Response: Treated groundwater will be blended with MWD water, or clean groundwater from deeper zones or from other sources. Radon levels in MWD water and other water sources are expected to be below the proposed MCL of 300 pCi/l. The blended water would therefore meet MCLs for nitrate and radon. The treated, blended groundwater must meet all MCLs before it may conveyed to the public water distribution system. In addition, it should be noted that any radon in the extracted groundwater would likely be removed during treatment by air stripping. For additional discussion please see Section 6.0 of the ROD.

94. (FS Page 3-9) An alternative should not be dismissed because treatability studies may be required since they may be necessary even for proven technologies.

EPA Response: The detailed costs for alternatives include some costs for treatability studies for all of the technologies carried through detailed analysis. Technologies were not eliminated based solely on the need for treatability studies. However, because the remedial action for this OU is an interim action and includes high flow rates, the FS primarily evaluated technologies that had been implemented at large scale (greater than 1 mgd) and that were

proven at reliably meeting drinking water standards even at such a large scale.

95. (FS Page 3-10) Technologies appear to have been eliminated based on probable cost and not actual calculated values. We believe costing should have been completed on viable options to make unbiased comparison of the various technologies.

EPA Response: See EPA Responses to ITT Comments 36, 50, 51, 53, 54 and 88.

96. (FS Page 3-19) Nitrates and TDS levels measured in the groundwater of the San Fernando Valley are above the MCL throughout the basin in the water table aquifer. The levels of TDS are generally higher in the shallow groundwater of the basin; agricultural activities in the basin would have contributed to the TDS levels. Nitrates are also believed to have been derived from agricultural activities and septic systems prior to installation of sewer systems in the valley. As these constituents are a pre-existing condition and are extremely expensive to treat, potential responsible parties should not have to treat groundwater to remove them. Blending provides an economical solution, and this option already has been accepted in the Burbank ROD.

EPA Response: Blending was included in the North Plume OU FS, was carried through detailed analysis, and was included in EPA's preferred alternative. EPA was required to evaluate nitrate treatment in the FS due to the potential final uses of the treated water. EPA does not consider blending to be treatment. However, if the municipality agrees to accept the VOC-treated water, then the municipality can perform blending (in compliance with the California Department of Health Services Office of Drinking Water) to meet the nitrate drinking water standard. But, if the final use of the VOC-treated water involves reinjection in an area where the groundwater quality may be degraded unless the nitrate MCL is met in the water to reinjected, the VOC-treated water will need to be treated further to meet the nitrate MCL. Nitrate treatment might also be required in order to implement the alternative involving discharge to the river. EPA considered treatment for nitrate because the final use of the water may require it, however, it is again important to note that nitrate treatment was not included in EPA's preferred alternative.

97. (FS Page 3-26) Numerous technologies are proposed for removal of nitrates. These technologies appear to have been evaluated using different criteria than those used for the organic compounds, in that impractical and difficult treatments are evaluated and considered for nitrate removal and are categorically dismissed for the VOCs. Great detail is provided for this option but not for other alternatives. It is unclear why the depth of information is provided only for these options and not for the organic treatment

systems. All the technologies should be evaluated using the same selection criteria to make decisions on remedy selection.

EPA Response: The same selection criteria, effectiveness, implementability, and estimated costs, were used to evaluate both VOC and nitrate treatment options. Detailed descriptions of the potentially applicable technologies for VOC and nitrate treatment are provided in Section 3.0 of the FS. Again, please review EPA Responses to ITT Comments 36, 50, 51, 53, 54 and 88.

98. (FS Page 3-28) As discussed, to meet the Basin Plan (1975) for the San Fernando Valley the treated water should be blended to meet the inorganic requirements. In addition, should a reinjection option be implemented by the USEPA, variances should be considered for the reinjected treated water as a cost-effective measure, followed by treatment of groundwater further downgradient at the point of use.

EPA Response: As discussed above in EPA's Response to ITT Comment 86, EPA has determined that the anti-degradation policy of the RWQCB Los Angeles Region's Basin Plan is an ARAR for recharge/reinjection at the Glendale North OU. Please review Section 10 of the ROD for a more detailed discussion. In addition, both reinjection of groundwater treated for VOCs with and without prior treatment for nitrates are included in the alternatives developed in Section 5.0 of the FS.

99. (FS Page 4-2) Regarding the additional cluster well to be installed at Victory and Alameda, Well P-1, the FS states that it will monitor the migration of the contamination. The well location appears to monitor upgradient sources; however, more information is needed to justify this location and explain why it is sufficient to complete the evaluation of the extent of the groundwater plume. A discussion should be included about the upgradient conditions and their possible impacts on both the Upper and Lower zones within the Glendale Study Area.

EPA Response: Other locations and additional monitoring can be considered during the design phase of the interim remedy. The proposed location of Well P-1 was intended to monitor downgradient contaminant migration. Again, all well locations discussed in the FS are proposed locations. Final locations will be determined during the remedial design phase.

100. (FS Page 4-3) Why is it necessary to develop new QA/QC and Health and Safety Plan as opposed to updating the plans for the well installation? Why aren't existing plans sufficient; were they prepared according to USEPA guidelines? A specific sampling and analysis plan is appropriate.

EPA Response: Plans were prepared in accordance with EPA guidelines but were specifically designed to address fieldwork